INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 1995	**Park:** Shenandoah NP
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Permit#:
SHEN1995ANOX

Park-assigned Study Id. #:
unknown

Project Title:
Stream-Groundwater Interaction In A Saprolitic Aquifer, Old Rag Catchment, Shenandoah National Park

Permit Start Date: Jan 01, 1998	**Permit Expiration Date** Jan 01, 1998
Study Start Date: Jan 01, 1995	**Study End Date** Jan 01, 1998

Study Status:
Completed

Activity Type:
Other

Subject/Discipline:
Water / Hydrology

Objectives:
1)To quantify the dynamics of stream-groundwater interaction through numerical simulation of solute transport with transient storage in South Fork Brokenback Run, using experimental in-stream tracer tests;;2)to install devices to acquire hydrological data on stream flow and water tables within the catchment drained by South Fork Brokenback Run; and;3)to develop TOPMODEL simulations of predicted runoff within the catchment in order to test conceptual models of water movement within the catchment.

Findings and Status:
The South Fork of Brokenback Run drains a land area of 2.37 square kilometers. The catchment is saddle-shaped, and topographic indices are relatively low, indicating the absence of a significant headwater at the distal end of the catchment. The response of the water tables have remained below the surface at the observation points, i.e., we have not observed significant saturation of the land surface. Although this is no doubt a result of the dryness of the catchment during monitored events, the preliminary conclusion is that water movement through the subsurface (dominated by thin, 1-m, soils and weathered granite, saprolite) is relatively rapid.;The in-stream tracer tests have indicated a relatively small hyporheic zone, where surface and subsurface water mix in the sub-stream, which is variable. In the lower anastomosing channel network, the hyporheic zone is larger (and lateral inflows smaller) than in the main stream channel. Additional in-stream tracer tests, using non-conservative tracer, have yet to be evaluated. These results will hopefully shed some light on the role of hyporheic zone biogeochemical processes on stream water chemistry.;Hornsberger - The in-stream tracer tests confirm the anticipated interactions between the active stream and the hyporheic zone. Data suggest that in areas of lower slope the interactions between the stream bed and the water in the active stream is quite strong. This has implication for biogeochemical cycling in this region. Rapid responses observed in piezometers near the stream indicate rapid subsurface flows during storms. Again, quantifying this type of catchment response in the Blue Ridge Mountains is important for understanding potential hydrochemical responses to streses such as changes in atmospheric deposition or climate change.

For this study, were one or more specimens collected and removed from the park but not destroyed during analyses?
No

Funding provided this reporting year by NPS:	**Funding provided this reporting year by other sources:**

0	10000
Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college	
Full name of college or university:	**Annual funding provided by NPS to university or college this reporting year:**
UNIVERSITY OF VIRGINIA	13464